

of claim 2 under §112, second paragraph is moot. Applicants have amended claims 4-6, 9-12, 15, and 16 in a manner that addresses and remedies the issues raised in the Office Action. For example, claims 4-6, 9-12, 15, and 16 have been amended to include "a group consisting of," where applicable; claim 9 has been further amended to better define construction of the non-magnetic metal ground layer; and claim 16 has been further amended to better define the composition of the separation layer. Thus, Applicants respectfully request that the rejection to claims 2, 4-6, 9-12, 15, and 16 under §112, second paragraph be withdrawn.

Rejections Under 35 U.S.C. §102

Claims 1-4 and 12 were rejected under 35 U.S.C. §102(e) as anticipated by *Futamoto et al.*, U.S. Patent No. 6,383,667.

Independent claim 1 recites a magnetic recording medium comprising:
a non-magnetic substrate;
a non-magnetic metal ground layer formed on a main surface side of the non-magnetic substrate and containing Ru at least 20 at%; and
a magnetic layer formed on the non-magnetic metal ground layer and having a metal magnetic thin film.

Futamoto discloses a magnetic recording medium including a non-magnetic substrate 11, an underlayer 12 provided on the substrate, a Co alloy magnetic film formed through the under layer 14, and a protective film for protecting the magnetic film 15. See Abstract. The underlayer 12 is a two layer structure, wherein a lower underlayer 12a is covered by an upper underlayer 12b. The upper underlayer 12b is covered by the Co alloy magnetic film 14, and can be a Co—Ru_x—Cr_y alloy, wherein the atomic concentration for x is 5 atomic % < x ≤ 65 atomic % and y is 35 atomic % ≥ y ≥ 9 atomic %. *Futamoto* further discloses a number of embodiments illustrating various layer structures of the magnetic recording medium (see Figs. 2-4 and 7-9). In each embodiment, however, the upper underlayer was the only layer containing Ru or a material being of an Ru mixture.

As noted above, independent claim 1 includes "a non-magnetic ground layer formed on a main surface side of the non-magnetic substrate containing Ru at at least

20 at%” and “wherein the non-magnetic metal ground layer is constructed by layering a plurality of layers, each layer including Ru at at least 20 at% and different compositions containing Ru and an element other than Ru.” *Futamoto* fails to disclose, teach, or suggest at least the aforementioned claim element. Instead, *Futamoto* discloses a magnetic recording medium having a number of layers where only the upper underlayer is formed by a material containing the element Ru, among others.

To properly anticipate a claim, the document must disclose, explicitly or implicitly, each and every feature recited in the claim. See Verdegall Bros. v. Union Oil Co. of Calif., 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). As discussed above, *Futamoto*, fails disclose, teach, or suggest at least a non-magnetic metal ground layer, “wherein the non-magnetic metal ground layer is constructed by layering a plurality of layers, each layer including Ru at at least 20 at% and different compositions containing Ru and an element other than Ru,” as recited in claim 1. For at least this reason, Applicants submit that *Futamoto* does not anticipate independent claim 1. Applicants respectfully request, therefore, withdrawal of the rejection of claim 1 under 35 U.S.C. § 102, and allowance of this claim.

Claims 3, 4, and 12 depend either directly or indirectly from claim 1. By virtue of this dependency Applicants submit that these claims are allowable for at least the same reasons given above. Moreover, claims 3, 4, and 12 further distinguish over *Futamoto* by the subject matter recite therein, and particularity with respect to each claim combination. As a result, Applicants respectfully request that the rejection of claims 3, 4, and 12 under §102(e) be withdrawn and these claims allowed.

Rejections Under 35 U.S.C. §103

Claims 5, 11, and 15 were rejected under 35 U.S.C. §103(a) as unpatentable over *Futamoto* in view of *Honda et al.*, U.S. Patent No. 5,851,643. Claim 6 was rejected under 35 U.S.C. §103(a) as unpatentable over *Futamoto* in view of *Shiroishi et al.*, U.S. Patent No. 4,833,020. Claims 7, 8, and 13 were rejected under 35 U.S.C. §103(a) as unpatentable over *Futamoto* in view of *Suzuki et al.*, U.S. Patent No. 6,335,103. Claims 9 and 10 were rejected under 35 U.S.C. §103(a) as unpatentable over *Futamoto* in view of *Wu et al.*, U.S. Patent No. 6,218,003. Claim 14 was rejected under 35 U.S.C.

§103(a) as unpatentable over *Futamoto* in view of *Ranjan et al.*, U.S. Patent No. 5,976,326. Claim 16 was rejected under 35 U.S.C. §103(a) unpatentable over *Futamoto* modified by *Honda*, and further in view of *Ishikawa et al.*, U.S. Patent No. 5,750,230.

Claims 5-11 and 13-16 depend either directly or indirectly from independent claim 1. By virtue of this dependency, Applicants submit that claims 5-8, 11, and 13-16 are allowable for at least the same reasons given above. Moreover, neither *Honda*, *Shiroishi*, *Suzuki*, *Wu*, *Ranjan*, nor *Ishikawa* remedy the deficiencies of *Futamoto* discussed above. Most notably, the aforementioned references fail to disclose teach or suggest either singly or combined at least "the non-magnetic metal ground layer is constructed by layering a plurality of layers, each layer including Ru at at least 20 at% and different compositions containing Ru and an element other than Ru," as recited in claim 1. Thus, Applicants respectfully request that the rejections of claims 5-11 and 13-16 under §103 be withdrawn, and these claims allowed.

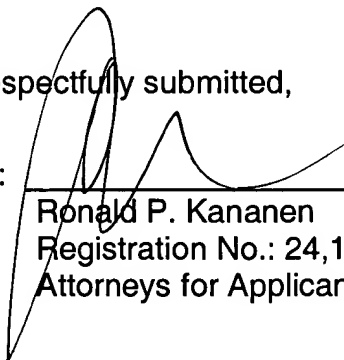
Conclusion

Based on at least the foregoing amendments and remarks, Applicants submit that claims 1 and 3-16 are allowable, and this application is in condition for allowance. Accordingly, Applicants request favorable reexamination and reconsideration of the application. In the event the Examiner has any comments or suggestions for placing the application in even better form, Applicants request that the Examiner contact the undersigned attorney at the number listed below.

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Respectfully submitted,

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Enclosure(s): Appendix to Amendment (Marked-Up Version of Amended Claims)

In the event additional fees are necessary in connection with the filing of this paper, or if a petition for extension of time is required for timely acceptance of same, the Commissioner is hereby authorized to charge Deposit Account No. 180013 for any such fees; and applicants hereby petition for any needed extension of time.

APPENDIX to Amendment**(MARKED-UP VERSION OF AMENDED CLAIMS)**

For the convenience of the Examiner, all of the pending claims are hereby presented.

1. (Amended) A magnetic recording medium comprising:
a non-magnetic substrate;
a non-magnetic metal ground layer formed on a main surface side of
the
non-magnetic substrate and containing Ru at least 20 at% [or more]; and
a magnetic layer formed on the non-magnetic metal ground layer and
having a
metal magnetic thin film.
2. (Amended) The medium according to claim 1, wherein the non-magnetic
metal ground layer is constructed by layering a plurality of layers [which have] ,
wherein each layer includes Ru at at least 20 at % different compositions
containing Ru and element other than Ru, respectively. [from each other]
3. (Amended) The medium according to claim 1, wherein the non-magnetic
metal ground layer has [such] a graded composition [in which] such that a
composition of the non-magnetic metal ground layer continuously changes
[sequentially in a film thickness direction].
4. (Amended) The medium according to claim 1, wherein the non-
magnetic metal ground layer is made of alloy of Ru and at least one kind of
material selected from a group consisting of Cr, Ti, Ta, Zr, Hf, Fe, Co, Mn, Si, Al,
Ag, Au, and Ir, and a composite ratio of Ru in the alloy is set to at least 50 at%

[or more].

5. (Amended) The medium according to claim 1, wherein the non-magnetic metal ground layer is made of an Ru alloy [of Ru] and at least one kind of material selected from a group consisting W, Mo, V, Nb, and B, and a composite ratio of Ru in the alloy is set to at least 20 at% [or more].

6. (Amended) The medium according to claim 1, wherein the non-magnetic metal ground layer is made of alloy of Ru and at least one kind of material selected from a group consisting of Cu, Ni, Pd, Pt, Y, and C, and a composite ratio of Ru in the alloy is set to 80 at% or more.

7. (Amended) The medium according to claim 1, wherein the non-magnetic metal ground layer contains at least one of oxygen [and/or] and nitrogen.

8. (Amended) The medium according to claim 7, wherein the at least one of oxygen [and/or] and nitrogen is contained at a composite ratio of 0.2 to 10 at% in the non-magnetic metal ground layer.

9. (Amended) The medium according to claim 1, wherein the non-magnetic metal ground layer is constructed by adding at least one kind of material selected from a group consisting of oxide, nitride, carbide, and carbon and formed in a granular structure.

10. (Amended) The medium according to claim 9, wherein the oxide

includes at least one kind of material selected from a group consisting of SiO₂, Al₂O₃, TiO₂, Ta₂O₃, ZrO, Y₂O₃, and MgO, the nitride is at least one kind of material selected from a group consisting of TiN, BN, AlN, Si₃N₄, and TaN, and the carbide is at least one kind of material selected from a group consisting of SiC, TiC, B₄C, and TaC.

11. (Amended) The medium according to claim 1, wherein the magnetic layer is constructed by layering a plurality of metal magnetic thin films, with at least one intermediate layer inserted therebetween, the intermediate layer being made of at least one kind of material selected from a group consisting of Pt, Pd, and Ni.

12. (Amended) The medium according to claim 1, wherein the magnetic layer contains at least one kind of material selected from a group consisting of Cr, Mo, W, V, Nb, Zr, Hf, Ta, Ru, Rh, Ir, Ti, B, P, and C at 0.5 to 25 at%.

13. (Amended) The medium according to claim 1, wherein the magnetic layer contains at least one of oxygen [and/or] and nitrogen at 0.2 to 15 at%.

14. (Amended) The medium according to claim 1, wherein the magnetic layer is constructed by at least one kind of material selected from a group consisting of oxide, nitride, and carbide, formed in a granular structure.

15. (Amended) The medium according to claim 1, wherein the magnetic layer is constructed by layering a plurality of metal magnetic thin films, with at least one separation layer inserted therebetween, the separation layer being made of Ru singly or alloy of Ru and at least one kind of material selected from a group consisting of Al, Ti, V, Cr, Fe, Mn, Co, Ni, Cu, Y, Zr, Nb, Mo, Rh, Pd, Ag, Hf, Ta, W, Ir, Pt, Au, Si, B, and C.

16. (Amended) The medium according to claim 15, wherein the separation layer [is layered as a layer made of] includes Ru or an Ru alloy, and further includes one of an oxide, a nitride, a carbide, or an oxide, nitride, or carbide mixture and at least one kind of material selected from a first group consisting of Cr, Mo, W, Ti, Ta, Nb, Ni, Cu, Al, V, Zr, Hf, C, B, and Si, and a second group consisting of oxide, nitride, and carbide, the oxide including SiO₂, Al₂O₃, TiO₂, Ta₂O₃, ZrO, Y₂O₃, and MgO, the nitride including TiN, BN, AlN, Si₃N₄, and TaN, and the carbide including SiC, TiC, B₄C, and TaC, the separation layer is mixed with at least one kind of material selected from the second group, or the separation layer is mixed with at least one kind of material selected from the first and second groups.